RS232 Control for Runco WindowWall

The ascii protocol for RS232 in the Runco WindowWall™ lets you use English words with a minimum of mysterious code.

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You should already know how to operate the Runco WindowWall with the remote control and how to read the menus. See the Runco WindowWall Installation Guide for more information.

Connecting RS232 Communication

RS232 control is not necessary for operation, but is a convenient way to control tiles from a computer at a distance. If your installation will not use RS232 control, skip this section.

Everything you can do with the remote, you can do with RS232 commands. Plus, you can send inquiries to the tiles and find out the current settings and values.

RS232 connections are made with cables like Ethernet straight-through cables. This is the common type of LAN connection cable sometimes called a Cat 5 cable.

Note: It is important that the RJ-45 cable has "straight through" connections. To see if your cable is correct, hold the two connectors side by side with the ends pointing in the same direction. Look at the sides of the connectors that do not have the locking tab. If the colors of the wires inside the connectors are the same left to right for both connectors, this is the correct cable. If the colors are mirror reflections of each other, it is the wrong type.

You need an adapter to go from the computer's 9-pin serial output connector to an RJ-45 connector. Adapters of this type are readily available at computer and electronic supply stores. The adapter is not pre-wired. You will make three connections inside the adapter, as described below.

Wiring the adapter

To go from 9-pin D-sub serial connector on the back of the computer to an RJ45 connector, use a standard RJ45-to-9-pin adapter. Wire it internally as shown. The wiring shown for this adapter is correct for *straight-through* cables. Straight-through cables are wired 1-to-1, 2-to-2, etc.

	RJ45	9-pin
Yellow wire	6	3
Black wire	3	2
Green wire	5	5

RJ45 looking into the socket

You will only need one adapter; all the rest of the connections will be RJ-45 to RJ-45 using the RS485 In and Out connectors. RS485 is used after the first tile because the signal it carries is more reliable and less disturbed by electrical interference.

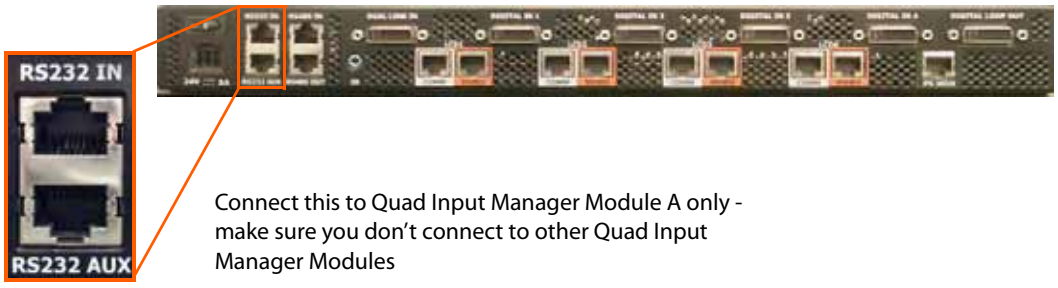
Connecting RS232 Cables

1 Connect the 9-pin adapter to the serial output connector of the controlling computer. (This computer does not have to be the same one as the computer used as a picture source.) The serial output is sometimes called the Comm Port, and sometimes there is more than one.

Note: Some computers have an RS485 output. You can connect this directly into the nearest tile's RS485 In connector.

2 Connect this first tile's RS485 Out connector to the next tile's RS485 In connector.

For more information about configuring RS232 communications, see the WindowWall Installation Manual.



How to Form Commands

Basic Rules

- RS232 commands consist of a string of ascii characters.
- All numeric values are decimal; you do not need to use hex or binary digits in the commands.
- Spaces or tabs may be used in the commands to separate the parts and make them easier for humans to read. This “white space” is ignored by the command reader in the Runco WindowWall.
- You cannot use commas, slashes, or other punctuation as separators. Periods have a special purpose in commands.
- Commands are not case sensitive, so you can use upper and lower case letters as you wish, EXCEPT the first two letters of every command must be both upper or both lower case. After that, it doesn’t matter.
- When a command requires a response, wait for the response before sending another command to another tile.
- All commands must end with a carriage return character, shown as [CR] in the rest of this document. Depending on your serial communications program, commands may automatically be ended with a [CR]. If you are uncertain whether your application automatically does this, send a test command such as `ky 00 menu` without a [CR]. If the menu displays on screen, you will not need to insert a [CR]. If nothing happens, you will need to add a [CR] at the end of each command.

Types of Commands

Key Commands

Key commands simulate pressing a key on the remote control. This is not very useful unless you can see the screen, because you won’t know where the selector is in the menu.

Operation Commands

Tip: Operation commands are more flexible and easier to use than Key commands

Operation commands tell the tile exactly what to do.

- Set green in the white color balance to 27
- Save the current settings into memory slot 23
- Recall memory slot 7

Operation commands can ask questions and get answers, such as:

- What is the state of the backlights? (on, off, failed, etc.)
- Which connector is used if memory slot 3 is recalled?

String Commands

String commands send strings of characters to the tile.

String commands can also retrieve information from the tile. For instance,

```
ST A1 BUILD.DATE? [CR]
```

returns the build date of the firmware:

```
ST A1 BUILD.DATE= "JUN 15 2009 08:48:24"
```

Addresses in Commands

All commands must be addressed. Each tile has a two-character ID that is unique to it. The first character is A-P and the second character is 1-4. The first character is called the **Group ID**, and the second one is the **Unit ID.** The Group ID is the Quad Input Manager Module address and the Unit ID is the processor on that module.

- Commands can be addressed to **individual** tiles: A1, B2, C3, D4. When this form of address is used, the tile will respond to the host computer.

  Note: Whenever a command is sent to an **individual** ID, wait for the response before sending a second command.

- Commands can be addressed to **all** tiles: **
- Commands can be addressed to a **group** of tiles: *4 (all tiles with 4 as the Unit ID), A* (all tiles with A as the Group ID).

Command Structure

All commands start with **two letters**:

`OP` or `op` for operations commands (but not `Op` or `oP`)

`KY` or `ky` for key commands (but not `Ky` or `kY`)

`ST` or `st` for string commands (but not `St` or `sT`)

The next two characters are the **address**.

The next section of the command is the operation, the remote key, or the string, the main part of the command telling the tile what to do.

A few commands have a 'target.' For example, to adjust white balance, you must state which color to change: red, green, blue, or all. Or to determine whether a memory slot is empty, you must target the memory slot number. **The target is always in (parentheses).**

The next character is the command function symbol. There are five function symbols:

Function	Symbol	Action on the tile
Set	=	Makes the tile take that value
Get	?	Asks what the value is
Increment	+	Adds 1 to the current value
Decrement	–	Subtracts 1 from the current value
Execute	[none]	Performs an action, such as a reset

- Some commands are Execute only, such as resetting the lamp hours.
- Others are Set and Get only, such as setting the pattern or asking what the pattern is.
- Some are Get only, such as getting the horizontal frequency of the source.
- And some are Set, Get, Increment, Decrement, such as color balance.
- The last part of the command, for Set commands only, is the **value**. The value may be a number or one or two words.

Sample Operation Commands

Command Example[1]	Explanation
`op A3 auto.position.disable = DISABLED [CR]`	Disable the auto position feature in tile A3
`op G4 auto.position.disable ? [CR]`	Is the auto position feature enabled or disabled in tile G4?
`op A* brightness + [CR]`	Increment the brightness in all tiles with Group ID A
`op ** window.reset.size [CR]`	Makes all the Zoom and Viewport settings return to the default values.
`op A1 center.point (red) ? [CR]`	What is the value for the red pixel at the center (sampling) point in tile A1?

[1]The command line must always end with a carriage return character, noted in the examples above as [CR]. The Runco WindowWall will not act on the command unless the last character is a carriage return character (ascii hex value: 0D).

Sample Key Commands

Command Example	Explanation[1]
ky A1 menu [CR]	Press the MENU button on the remote for the entire wall
ky A1 down [CR]	Press the down arrow on the remote for the entire wall
ky A1 enter [CR]	Press the ENTER button on the remote for the entire wall

[1]As you can see from Sample Key Commands sequence, if you are not looking at the screen, you won't know what you just did. You don't know where the cursor was at the start.

Sample String Commands

Command Example	Explanation
st A1 revision ?[CR]	What is the revision level of tile A1?

Using the Operation Commands Table

The Operation Commands table starts on page 19.

Operations and Operation Numbers

The commands are listed in alphabetical order by Operation. In a command, you may use either the **ascii text** of the operation or its **Operation Number**. For instance, to get the tile power, all these commands are equivalent:

```
op A3 display.power ? [CR]
opA3display.power? [CR]
op A3 1094 ? [CR]
opA31094? [CR]
OP  A3   dIsplAy.Power ?     [CR]
```

Target

If the Target column has anything in it, the command must use one (and only one) of the targets, and it must be in parentheses. Use either the ascii text or the Target Number. These are equivalent commands:

```
opa2 center.point (red) ? [CR]
opa21110(0)? [CR]
```

Command Types Allowed

Use only the types listed in the first column.

Symbol		Meaning	Example	Result
=	Set	tells the tile to take the value that follows	`op A* white.balance (all) = 100 [CR]`	All tiles with a Group ID of A (and Unit ID of anything) will set their white balance levels for red, green and blue to their maximum of 100
?	Get	asks for the value	`op A1 contrast ? [CR]`	Tells tile A1to send the value of contrast to the host computer. Note that the tile will *only* respond if it is addressed individually.
+	Increment	increments the value	`op ** gray.balance(red) + [CR]`	Makes all the tiles increase their Gray Balance value by one. Note that any tile whose value is already at the top (in this case 15) will not increase it.
–	Decrement	decrements the value	`op ** white.balance(green) – [CR]`	Makes all the tiles decrease their White Balance value by one. Any tile that had a white balance of 1 before the decrement will not change.
[none]	Execute	means the command is executed. No character follows the command (or the Target, if it has one)	`op ** slot.save (0) – [CR]`	Saves slot 1 to memory.

Note: Any word or character or phrase that appears between [square brackets] is for information or clarification only. It is not sent to the tile or received from it.

Values

The Value may be sent as text or as a value number.

Text values can be sent in upper or lower case or with mixed case. They are listed in UPPER CASE in the table to make it easier to see the difference between the value and any [explanation].

[varies] means the range of acceptable values and replies varies with the type of source.

Reading the Response

Two commands establish the features of the replies. (Remember the tiles only reply when individually addressed.)

`ascii.eol` determines the End Of Line character the tile will send at the end of every command.

`ascii.response` determines how you want the replies to look when they come back to you.

- `Symbolic` means the replies will come back as ascii characters, if the value column allows them.
- `Numeric` means that the Value Number will come back
- `Data` means that only the value is returned, not the preceding information

The following table shows examples of each setting for `ascii.response` and three possible responses:

Command Sent	Response	Explanation
`op A1 ascii.response = symbolic [CR]`	`OPA1ASCII.RESPONSE=SYMBOLIC`	The tile received the command and has set the response type to symbolic and replies will be ascii characters
`op A1 pattern ? [CR]`	`OPA1PATTERN=BLACK`	The current test pattern is black.

Command Sent	Response	Explanation
op A1 ascii.response = numeric [CR]	OPA11137=1	The tile received the command and has set the response type to numeric and will reply with the value number
op A1 pattern ? [CR]	OPA11036=6	The current test pattern is black.
op A1 ascii.response = data [CR]	ACK	The tile received the command and has set the response type to data and will reply with only a number
op A1 pattern ? [CR]	6	The current test pattern is black.

Note: Replies are always in ALL CAPS, regardless of how the query was sent.

Using Key Commands

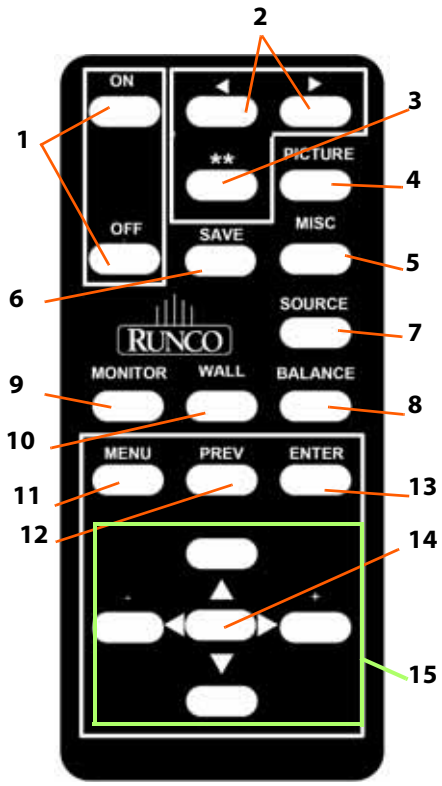
Key commands always start with `ky` or `KY`. There are two kinds of key commands, command word and numeric equivalent commands.

Command Word Key Commands

Command word key commands simulates pressing a button on the remote. For example, the command:

```
ky A1 menu  [CR]
```

simulates pressing the menu button. All the other named buttons on the remote control can be “pressed” in this manner by using the name on the remote. This picture shows the command for each named key:



Note: Keep in mind that you need to point the remote towards where the IR sensor is mounted.

Remote Control Buttons

Number	Definition
1	Turn the tile ON/OFF.
2	Move the target left or right.
3	Set the target to all at once.
4	With each press, go to Picture, Input Levels, Aspect Ratio, Picture Position, Zoom Top & Left, Zoom Bottom and Right.
5	Press once for Miscellaneous Options, twice for Backlight Settings, three times for Serial Port Settings.
6	Press once for Recall, twice for Save.
7	Takes you to the next Quick Configure setting (Big Picture, A1, A2, etc.)
8	Press once for the Color Balance menu.
9	With each press, go to Unit Status, Serial Port Status, Setup Summary and Test Patterns.
10	Open the Wall Configuration menu.
11	Bring up the on-screen menus.
12	Return to the previous menu.
13	Press to select a menu option.
14	Move highlight to the top line of the menu.
15	Arrow keys move the highlight around on the menu to select the option you want.

Numeric Equivalent Commands

Numeric equivalent commands also simulate pressing a remote button. For example, the command:

```
ky A1 r43   [CR]
```

simulates pressing the MENU key on the remote. All the keys have "R" numbers associated with them, even keys that don't exist on the real remote.

In the illustration below, the white buttons don't exist on the remote, and the shaded buttons contain the command key equivalent:

RØØ on	**RØ1** target.left	**RØ2** target.right
R1Ø	**R11** **	**R12** picture
R20 off	**R21** save	**R22** misc
R3Ø	R31	**R32** source
R40 monitor	**R41** wall	**R42** balance
R50 menu	**R51** prev	**R52** enter
R6Ø	**R61** up	R62
R70 left	**R71** top	**R72** right
R8Ø	**R81** down	R82

Note: Although they don't exist on the remote, there are two more key commands that can be used: target.up and target.down.

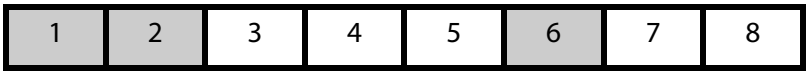
Examples of Operation Commands

Recalling Memories

Remember: The slot target number used in the command is *one less than* the memory slot number as seen in the menus. For example, to recall memory slot #40, in commands you'd specify `slot.target = 39`. Likewise, to recall the first slot, you'd specify `slot.target = 0`.

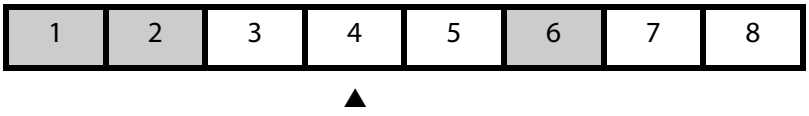
Recalling Memories Directly

Use `slot.recall ( )`. Put the memory number (minus 1) in the parentheses. What is the difference between `slot.recall.target` and `slot.target`? Assume that memory slots #1, #2, and #6 are used (full). Memory slots #3, #4, and #5 all the others are empty, as shown in the illustration below:

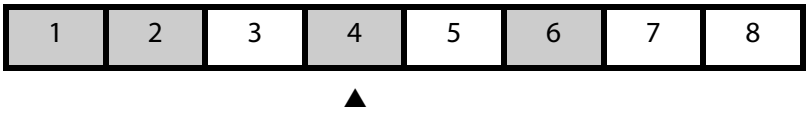


The following series of example commands show the difference between `slot.target` and `slot.recall.target` and which memory slot the command is pointing to.

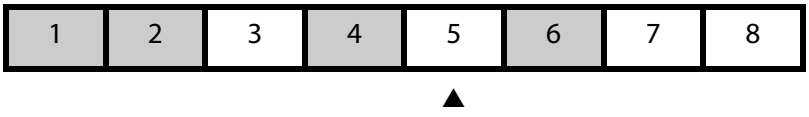
`op A1 slot.target = 3 [CR]`	This sets the memory slot to #4 in tile A1. Any further commands that need a memory slot will use this one until it is changed.



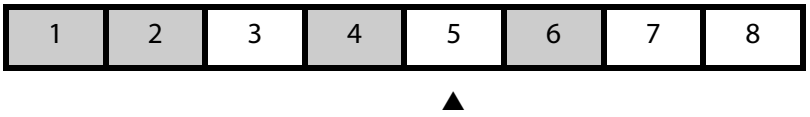
`op A1 slot.action (save) [CR]`	This saves all the current settings into memory slot #4 with the default memory name.



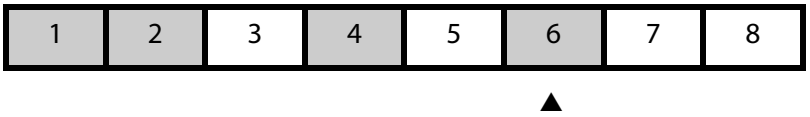
`op A1 slot.target = 4 [CR]`	This sets the memory slot to #5, which is empty.



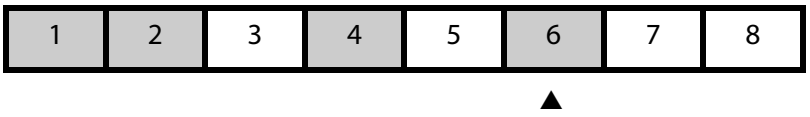
`op A1 slot.action (recall) [CR]`	This action fails, because there is nothing in slot #5. Nothing happens to the picture on the screen; it does not change.



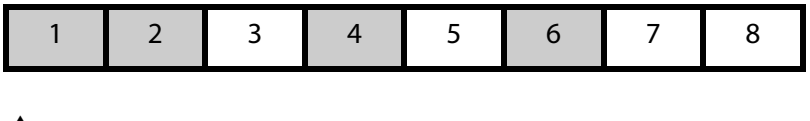
`op A1 slot.recall.target = 5 [CR]`	Sets the memory slot to #6.



`op A1 slot.action (recall) [CR]`	This recalls slot #6 because the target was set to #6 in the previous command.



`op A1 slot.action (recall) [CR]`	Recalls settings from memory slot #1.



Asking (Get) and Telling (Set)

To ask about a value or condition, use a question mark [?]. No character should follow the question mark. To set a value or condition, use an equal sign [=]. A value must follow the equal sign.

Get and Set Commands Compared

Command Example[1]	Explanation
`op A1 contrast ? [CR]`	Asks what the contrast is set to on tile A1.
`op A* contrast = 128 [CR]`	Sets the contrast on all tiles connected to Quad Input Manager Module A to 128.
`op A* contrast ? [CR]`	Won't work. All queries [?] must be addressed to individual tiles only; no asterisks [*] in the command line.

[1]The command line must always end with a carriage return character, noted in the examples above as [CR]. The Runco WindowWall will not act on the command unless the last character is a carriage return character (ascii hex value: 0D).

Types of Responses

Response from the tile can be Symbolic (mostly text), Numeric (mostly numbers), or Data.Whenever a command is sent to an individual ID, wait for the response before sending a second command.

Symbolic Response Examples

Command and Response Examples	Explanation
`opA1 auto.lamp ? [CR]`	Would get the Symbolic response
`OPA1AUTO.LAMP=DISABLE`	Text in responses are all caps, regardless of what you sent.

Numeric Response Examples

Command and Response Examples	Explanation
`op A1 auto.lamp ? [CR]`	Would get the Numeric response
`OPA11037=0`	Notice that you can send commands as text and get the response as numeric. 1037 is the Operation Number for auto.lamp, and 0 means Disabled. It works the other way, too. Ask the question with all numbers and get a text response, if ascii.response is set to Symbolic.

Data Response Examples

Command and Respond Examples	Explanation
`op A1 auto.lamp ? [CR]`	Would get the Data response
`0`	You get only the answer and only in numeric form. This is used mainly when a sequence of commands is sent and the data is acted upon by the program. For instance, the program might query each tile as to its lamp state, on or off, then send a Lamp On command to just those tiles that are off.

Note: Remember: tiles only respond when they are individually addressed. If you want to know a status or a value in six different tiles, you must ask the question six times, and you must wait for the response from each tile before sending the question to the next one.

An index follows the table that lists all the entries, plus other names for the entries. For instance, “memory” in the index will lead to “slot,” which is the name used in the commands to refer to memory numbers. All commands are Operation commands which should start with “op”, except those marked with [ST] which are String commands.

For String commands, use the form “`ST -- build.date ?`” without the quotes, and substitute the unit ID for the `--` . There is no target for string commands.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
1	ascii.eol	1138			= ?	CR CRLF LF LFCR	0 1 2 3	Determines the End Of Line character used in replies.
2	ascii.response	1137			= ?	SYMBOLIC NUMERIC DATA [only]	0 1 2	Determines the style of the reply: SYMBOLIC replies with the Value [except for what is in square brackets] NUMERIC replies with the Operation number and Value number DATA replies with the Value number only
3	aspect	1054			= ?	FILL CROP LETTERBOX 16X9 ONE.TO.ONE 4X3	0 1 2 3 4 5	
4	aspect.status	1092			?	EQUAL TALLER WIDER	0 1 2	TALLER and WIDER refer to the source picture being taller than or wider than the aspect ratio of the screen or wall.
5	auto.frequency.disable	17421			= ?	NOT.DISABLED DISABLED TOGGLE	0 1 2	
6	auto.lamp	1037			= ?	DISABLE ENABLE	0 1	

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
7	auto.phase.disable	17420			=	?			NOT.DISABLED DISABLED TOGGLE	0 1 2	
8	auto.position.disable	17422			=	?			NOT.DISABLED DISABLED TOGGLE	0 1 2	
9	auto.resync.disable	17438			=	?			NOT.DISABLED DISABLED TOGGLE	0 1 2	
10	backlight.intensity	1085			=	?	+	–	1-10		10 is maximum intensity.
11	baud	1143				?			2400 4800 9600 19200		Baud rate
12	bl.offset	1367			=	?	+	–	78-128		Individual offset for the backlight of the connected LCD. This is a signed byte with allowable values from -50 to 0. (The byte is converted to an unsigned word resulting in the values 78-128.) This value is stored on the LCD interface board and a copy is kept in the LCD. If no tile is attached, the copy is used.
13	bl.status	1287			?				ERROR FAILED NORMAL UNKNOWN	0 1 2 3	Status of the backlight for the connected LCD. If the LCD is turned off, the status is unknown. If the LCD reports a good status while it is turned off, there must be a sensor failure and the status is error. If no tile is connected result is UNKNOWN.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
14	black.balance	1402	RED GREEN BLUE ALL RESET	0 1 2 3 4	=	?	+	–			A target of “ALL” can only be used with increment and decrement commands. It will adjust all 3 of the colors; however if any color is already at its limit, no color will be adjusted. A target of “RESET” used will set all 3 colors to 0. The data for RESET is irrelevant but must be included in the command.
15	blue.only	1057			=	?			DISABLE ENABLE	0 1	
16	border.color	1151			=	?			RED GREEN BLUE DKBLUE DKGREEN DKRED BLACK WHITE	63488 2016 31 8 1024 32768 0 65535	
17	brightness	16387			=	?	+	–	0 – 255		Used when digital source is YPbPr.
18	build.date [ST]	1				?					Retrieves text: firmware compilation date and time.
19	bytes.received	1140	RS232 RS485 AUX232	0 1 2		?			0 – 32767		Used only to indicate that bytes have been received. Resets to zero upon reaching its maximum value.
20	bytes.sent	1141	RS232 RS485 AUX232	0 1 2		?			0 – 32767		Used only to indicate that bytes have been sent. Resets to zero upon reaching its maximum value.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
21	cable.equalization	1368			=	?			0-7		Value that varies with the length and quality of the Cat 6 cable used to connect the LCD video. This value is stored in the Quad Input Manager Module and communicated to the LCD interface board when it is connected.
22	center.point	1110	RED GREEN BLUE ALL	0 1 2 3		?			0 – 255		The center point is the one pixel used by auto level.
23	clear.input.memory	16902				[execute]					Makes the tile “forget” any sources it has seen before.
24	clipboard.bl.offset	1397				?					Backlight offset value that is currently in the clipboard.
25	clipboard.gray.balance	1163	RED GREEN BLUE ALL	0 1 2 3		?			0 – 15		
26	clipboard.recall	1161				[execute]					
27	clipboard.save	1162				[execute]					
28	clipboard.white.balance	1164	RED GREEN BLUE ALL	0 1 2 3		?			0 – 100		

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
29	clone.setting	1391		0-8 255	=				<operation>		*Applicable only to tile A1. Other processors will NAK.* Force the settings from tile A1 onto all other tiles in the system. Targets: 0: Clone only the operation given in the data 1: Clone items on Backlight Menu 2: Clone items on Miscellaneous menu 3: Clone items on Input Setup Menu 4: Clone items on Size & Position menus 5: Clone items on Big Picture Setup menu (except for row and column) 6:Clone items on Color Balance Menu 7: Clone items on Scaling Menu 8: Clone items on Factory Settings Menu 255: All items from targets 1-8
30	color.temp	1268			=	?			3200K 5500K 6500K 8500K NATIVE CUSTOM	0 1 2 3 4 5	
31	colorspace	1180				?			RGB YPBPR	0 1	
32	commands.received	1107	RS232 RS485 AUX232	0 1 2		?			0 – 32767		Used only to indicate that commands have been received. Resets to zero upon reaching its maximum value.
33	contrast	16388			=	?	+	–	0 – 255		Used when digital source is YPbPr.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
34	custom.pattern	1237	RED GREEN BLUE ALL	0 1 2 3	=	?	+	–	0 – 255		
35	display.power	1094			=	?			OFF ON	0 1	This turns on/off backlights.For queries, system.state provides more information. Power should only be sent to tile A1.
36	edid.mailbox	1261				?					
37	fan.state	1096	POWER.SUPPLY QUAD.MODULE LAMP INTAKE	0 6 1 6					ON UNKNOWN FAILED	0 1 2	
38	frame.compensation	1284			=	?			DISABLE ENABLE	0 1	
39	frame.height	1283			=	?	+	–			
40	frame.lock.enable	1292			=	?			DISABLE ENABLE	0 1	When disabled, tile will not try to frame lock.
41	frame.locked	1275				?			DISABLE ENABLE	0 1	
42	frame.width	1282			=	?	+	–			
43	frequency	16404			=	?	+	–	[varies]		
44	frequency.horizontal	1070				?			[KHz*100]		
45	frequency.pixel	1069				?			[MHz*100]		
46	frequency.vertical	16403				?			[Hz]		
47	gain.all	1033				?	+	–	0 – 255		For ?, returns the average of red, green, and blue. For + and –, adjusts red, green and blue. Applies to analog sources only.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
48	gain.blue	16394			=	?	+	–	0 – 255		gain.whatever adjusts the White Level; offset.whatever adjust the Black Level. Applies to analog sources only.
49	gain.green	16392			=	?	+	–	0 – 255		
50	gain.red	16390			=	?	+	–	0 – 255		
51	gamma	1086			=	?			DISABLE ENABLE	0 1	
52	gray.balance	1031	RED GREEN BLUE ALL	0 1 2 3	=	?	+	–	0 – 15		
53	horizontal.period	1264				?					
54	hue	16395			=	?	+	–	0 – 180		Used when digital source is YPbPr. This controls the color hue. Default value is 90.
55	interlaced	1065				?			OFF ON	0 1	
56	ir.remote	1095			=	?			DISABLE ENABLE	0 1	
57	justify	1053			=	?			LEFT [top] CENTER RIGHT [bottom] FILL	0 1 2 3	The values LEFT and RIGHT are used for top and bottom justification when the source aspect ratio is wider than the screen.
58	lamp.saver	1105			=	?			DISABLE ENABLE	0 1	This enables/disables DPMS delay.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
59	lamp.saver.delay.discrete	1286			=	?			0MIN 5MIN 10MIN 15MIN 30MIN 45MIN 1HR 2HR 4HR 6HR 8HR 12HR 24HR	0 1 2 3 4 5 6 7 8 9 10 11 12	
60	lamp.saver.delay.hours	1145			=	?	+	–	0 – 23		This is DPMS delay.
61	lamp.saver.delay.minutes	1144			=	?	+	–	0 – 59		This is DPMS delay with fine control.
62	lamp.saver.state	1146				?			DISABLED USER.OFF AUTO.OFF ON WAIT.ON	0 1 2 3 4	USER.OFF = Backlight is turned off because the user turned it off. AUTO.OFF = Backlight is off because lamp saver turned it off. ON = Backlights are on WAIT.ON = Backlights are off, waiting for the cool-down time-out to end so they can come on.
63	last.fault.hours	1149				?			0 – 32767		Elapsed system time, not real time, since last fault.
64	last.fault.minutes	1148				?			0 – 59		
65	lcd.horizontal.resolution	1125				?			1024, 1600, 1280, 1920		
66	lcd.vertical.resolution	1126				?			768, 1200, 720, 1080		

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
67	lcd.position	1369	CURRENT ROW COLUMN ALERT STORED	0 1 2 3 4		?					Returns the row/column position of the connected LCD. The position starts at 1 and goes up to 64. Targets 0,1 & 2 return the current position discovered at the sensors. If the panel is removed from the array (as in service mode) this position will be 1,1. If no tile is connected, the last known position will be used. If there was never a connected tile, 254 will be returned. Target 4 returns the position that has been stored after the last MATRIX.LAYOUT command and is the one used for subsequent MATRIX.ROUTE.QCONFIG operations. If there has never been a MATRIX.LAYOUT command, 254 will be returned. Target 0&4: Column is in the upper byte of a word, row is in the lower byte (i.e. Column*256+row). Target 1&3: Returns only the row or column. Target 3: Returns non zero if the stored value matches the current value.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
68	lcd.status	1374			?		bit field	Returns the status of the connected LCD, all in one 16-bit word. bit 0 = video status: High if sync is detected on the video interface. bit 1 = backlight status: High if backlight is on. bit 2-7 = Column position currently being sensed. bit 8-13 = Row position currently being sensed. bit 14 = Voltage under limit: High if the ADC reading is outside the limits set in the chip. Limits are set at startup to alert below 22v. bit 15 = 1 if the tile is connected. If tile is disconnected, all other fields should be ignored.
69	lcd.vertial resolution	1126						
70	lcd.voltage	1396			?	0-2600		Returns the voltage read by the attached LCD. Values below 22v is cause for concern. Value is multiplied by 100 to give hundredths precision. Returns NAK if no LCD is connected.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
71	matrix.layout	1377	AUTO RESET	0 2	=	NOT.STARTED IN.PROGRESS COMPLETE ERROR WONT.FIT	0 1 2 3 4	*Applicable only to tile A1. Other processors will NAK.* Force the system to re-discover the layout by polling all possible tiles for their position. Targets: 0 or 1: Perform Discovery 2: Re set system to default A get returns the status of the discovery process. WONT.FIT means the discovered layout is wider or taller than 9x9 and so won't fit on the GUI. This is not an error. ERROR means that more than one tile reported the same position. This usually happens if a tile is in service mode.
72	matrix.layout.module.at	1380	(column-1) 256 + (row-1)		?	0-15, 255		*Applicable only to tile A1. Other processors will NAK.* Returns the module (A=0,B=1…) of the LCD which is currently at the requested row and column Returns 255 if there is no LCD at that location.
73	matrix.layout.module.exists	1381	A1-P4 SUBWALL.1 SUBWALL.2 SUBWALL.3 SUBWALL.4 SUBWALL.DUAL.LINK SUBWALL.TWO.INPUT CUSTOM NONE	0-63 64 65 66 67 68 69 254 255				*Applicable only to tile A1. Other processors will NAK.* Returns non 0 if the requested processor exists in the system even if there is no LCD connected. This command is useful for knowing what inputs exist in the system.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
74	matrix.layout.position	1398	A1-P4 SUBWALL.1 SUBWALL.2 SUBWALL.3 SUBWALL.4 SUBWALL.DUAL.LINK SUBWALL.TWO.INPUT CUSTOM NONE	0-63 64 65 66 67 68 69 254 255							*Applicable only to tile A1. Other processors will NAK.* Returns the position in the WindowWall for the requested tile as determined during discovery. If there is no LCD in that position, returns 0xfefe. If there is no Quad Input Manager Module in that position, returns 0xffff.
75	matrix.layout.processor.at	1382	(column-1) 256 + (row-1)						0-3, 255		*Applicable only to tile A1. Other processors will NAK.* Returns the processor (0=1, 1=2, 2=3,3=4) of the tile that is currently at the requested row and column. Returns 255 if there is no LCD attached at that position.
76	matrix.layout.size	1386	 HEIGHT WIDTH	0 1 2		?			height and width information (see Notes)		Returns the physical size of the array as determined during discovery. If discovery failed, returns the last known wall size (or else 255 if discovery has never successfully completed). Targets: 0 Return Width*256+Height 1 Height only 2 Width only
77	matrix.layout.unit.at	1385	(column-1) 256 + (row-1)						A1-P4 SUBWALL.1 SUBWALL.2 SUBWALL.3 SUBWALL.4 SUBWALL.DUAL.LINK SUBWALL.TWO.INPUT CUSTOM NONE	0-63 64 65 66 67 68 69 254 255	*Applicable only to tile A1. Other processors will NAK.* Returns the ID (0=A1, 1=A2, …63=P4) of the LCD that is currently at the requested row and column. Returns 255 (NONE) if there is no LCD at that position.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
78	matrix.route.module	1384	A B C D E F G H I J K L M N O P	0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60		?			bit field (see description)		*Use only on tile A1. Other processors will accept the command but the master needs to have the information for all tiles. So it must get the command first and then pass it on to the relevant tile.* Returns a bit field that represents the current FPGA route settings for the tile requested. To set each switch individually, use op_TOP_ROUTE bit 0-1 = switch 1 bit 2-3 = switch 2 bit 4-5 = switch 3 bit 6-7 = switch 4 bit 8-10 = external loop bit 11-12 = internal loop bit 13 = 0 if the external loop is enabled Values for switch 1 & 2: 0= Digital 1 1=Digital 2 2=use loop 3=use loop Values for switch 3 &4: 0= Digital 3 1=Digital 4 2=use loop 3=use loop Values for external loop 0=digital 1 1=digital 2 2=digital 3 3=digital 4 4=Dual Link In Values for internal loop 0=digital 1 1=digital 2 2=digital 3 3=digital 4

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
79	matrix.route.output	1399			?	high byte = tile to route (see target for TOPO_ROUTE_MODULE) Low byte: Loop Out LCD 1 LCD 2 LCD 3 LCD 4	0 1 2 3 4	*Use only on tile A1. Other processors will accept the command but the master needs to have the information for all tiles. So it must get the command first and then pass it on to the relevant tile.* Set the specified output to display the specified input. If necessary, the external or internal loop settings may be changed in order to accommodate the request. This could cause other LCD routing to change. Data 0=digital 1 1=digital 2 2=digital 3 3=digital 4 4=Dual Link In

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
80	matrix.route.qconfig	1379	 NEXT REFRESH	0 1 2		?			A1-P4 SUBWALL.1 SUBWALL.2 SUBWALL.3 SUBWALL.4 SUBWALL.DUAL.LINK SUBWALL.TWO.INPUT CUSTOM NONE	0-63 64 65 66 67 68 69 254 255	*Applicable only to tile A1. Other processors will NAK.* Configure routing and wall parameters for all processors in the system. If auto discovery has not been performed, or has failed, only the routing will be done. Otherwise wall mode will be turned on and the width, height, row and column settings for each tile will be set appropriately. Target 2: Data field is ignored. Redo the command with the same data as last time (used after new tiles were added or tiles moved around). Target 1: Data field is ignored. Uses the next possible input. For example, if A1 is currently being big pictured, big picture A2.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
81	matrix.route.qconfig (cont.)	1379									Target 0: Use the data field: Data 0-63: Big picture the input over the entire wall. Data 64-68: Spread 1 input over the whole Quad Input Manager Module (for each module in the system). 64=use Digital 1, 65= Digital 2,66=Digital 3, 67=Digital 4, 68=Dual Link In Data 69: Spread Digital 1 onto LCD 1&2 and Digital 3 onto LCD 3&4. Data 255 Route each input to its corresponding output and turn off wall mode. A get of this command returns the current configuration. Only the route information, not the wall parameters are used to determine the current configuration. If none of these configurations are set, 254 is returned.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
82	matrix.route.switch	1383			?	high byte = tile to route (see target for TOPO_ROUTE_MODULE Low byte: external loop switch 1 switch 2 switch 3 switch 4 internal loop enable internal loop	 0 1 2 3 4 5 6	*Use only on tile A1. Other processors will accept the command but the master needs to have the information for all tiles. So it must get the command first and then pass it on to the relevant tile.* Set the FPGA switch for the specified tile. To set all switches in the tile at once, use MATRIX.ROUTE.MODULE Values for switch 1-4: 0= self 1=other in pair (if 1,2; if 2,1; if3,4 if 4,3) 2=use loop 3=use loop Values for external loop 0=digital 1 1=digital 2 2=digital 3 3=digital 4 4=Dual Link In Values for internal loop 0=digital 1 1=digital 2 2=digital 3 3=digital 4 Value for internal loop enable 0=Use external loop 1=Use internal loop
83	menu.position.horizontal	12341			= ? + –	0 – 32767		Horizontal offset from the default side.
84	menu.position.vertical	12342			= ? + –	0 – 32767		Vertical offset from the default side.
85	menu.rotate	1038			= ?	NONE CLOCKWISE INVERTED COUNTER-CLOCKWISE	0 1 2 3	

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
86	menu.target	1393			=	ALL A0-P3	65535 2560 -6659	*Use only on tile A1. Other processors will accept the command but the master needs to send the information to all tiles. So it must get the command first and then pass it on.* Set which processor will respond when a slave menu is presented.
87	menu.target.move	1392	UP DOWN LEFT RIGHT ALL	0 1 2 3 4	=	ALL A0-P3	65535 2560 -6659	*Use only on tile A1. Other processors will accept the command but the master needs to send the information to all tiles. So it must get the command first and then pass it on.* Moves the target processor (the one that responds to input when a slave menu is presented) to the next tile in the WindowWall in the specified direction. If auto discovery has not been performed or there was an error, it will move in processor order. When the target is "ALL" the target processor is set to **.
88	menu.timeout	8194			= ? + –	0 – 60		Seconds menu will remain on screen; 0 = forever
89	menu.top	1189			[execute]			Used with Key commands to be sure the menu selector is at the top.
90	mode.id	16436			?	0 – 999		
91	native.frequency	1351				60HZ 50HZ	60 50	

Operation Commands for Runco WindowWall

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92	offset.all	1032				?	+	–	0 – 127		For ?, returns the average of red, green, and blue. For + and –, adjusts red, green and blue. Applies to analog sources only.
93	offset.blue	16393			=	?	+	–	0 – 127		offset.whatever adjusts Black Level. gain.whatever adjusts the White Level.
94	offset.green	16391			=	?	+	–	0 – 127		When colorspace = YPBPR, this controls the black level (Brightness) of whole picture, not just the green. Default value varies and is set at factory. Not used with digital sources.
95	offset.red	16389			=	?	+	–	0 – 127		
96	offset.reset	1177			[execute]						Sets offset.red, offset.green and offset.blue to mid levels.
97	ontime.average	1387				?			0-24		Applicable only to processor 1 of a tile. Other processors will NAK. Return the number of hours the system has been on per day.
98	ontime.days.overlimit	1389				?					Applicable only to processor 1 of a tile. Other processors will NAK. Return the number of days the system has been on for more hours than the limit (20 for WindowWall).

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
99	ontime.days.total	1388									Applicable only to processor 1 of a tile. Other processors will NAK. Return the number of days system has been collecting on time statistics. The system must be on at midnight for consecutive days in order to count statistics.
100	ontime.limit	1390									Applicable only to processor 1 of a tile. Other processors will NAK. Return the limit used in ontime.days.overlimit
101	osd.enable	1360									
102	overscan	1184			=	?	+	–	0 – 20 [% of image hidden at edges]		
103	part [ST]	2				?					Retrieves firmware part number

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
104	pattern	1028			=	?			NONE WHITE GRAY RED GREEN BLUE BLACK RED.SCALE GREEN.SCALE BLUE.SCALE GRAY.SCALE COLOR.BARS LOGO GRID CHECK4X4 COLORSCALE UNIFORMITY ALIGNMENT FOCUS CUSTOM CYAN YELLOW MAGENTA	0 1 2 3 4 5 6 7 8 9 10 11 12 18 20 21 22 24 25 26 28 29 30	
105	phase	16400			=	?	+	–	[Range 0–31]		Value for = or ? commands is 0 – 31. In the menu, the value is shown in degrees. Each step (0 – 31) is 11.25 degrees.
106	plug.and.play	1152			=	?			DISABLE ENABLE	0 1	Enables/Disables DDC (EDID) response; factory default is enabled.

Operation Commands for Runco WindowWall

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107	poll.pause	1400			=				0-65535		*Applicable only to tile A1. Other processors will NAK.* Turn off system polling for the number of seconds specified. 0 = Turns the polling on. 65535 = Turns the polling off forever (until the next AC power cycle). When polling is turned off, the "LCD" LEDs on the front panel of the Quad Input Manager Modules will not be updated. This takes away all periodic communications on the RS485 bus and makes troubleshooting of the communication bus easier.
108	position.horizontal	16398			=	?	+	–	[varies]		
109	position.vertical	16399			=	?	+	–	[varies]		
110	preferred. source.detection	1288			=	?			5x4 4x3 15x9 16x9	12 13 16 17	
111	product [ST]	3				?					Retrieves text: display product name.
112	product.type	1171				?					

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
113	ps.status	1176		1-5		FAULT OK OFF UNKNOWN	0 1 2 3	Applicable only to processor 1 of a tile. Other processors will NAK. Return the status of the requested power supply. Not all power supplies may be stuffed in a system. If a power supply is not stuffed, OFF is returned. If the sense cable from the power supply to the Quad Input Manager Module is disconnected, UNKNOWN is returned.
114	quad.input.status	1375			?		bit field	Applicable only to processor 1 of a tile. Other processors will NAK. Returns the status of the inputs for the five inputs in the Quad Input Manager Module. bit 0: High if sync detected on DIGITAL 1 bit 1: High if sync detected on DIGITAL 2 bit 2: High if sync detected on DIGITAL 3 bit 3: High if sync detected on DIGITAL 4 bit 4: High if sync detected on DUAL LINK IN

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
115	quad.lcd.status	1372				?					Applicable only to processor 1 of a tile. Other processors will NAK. Returns the status of the attached LCDS in the Quad Input Manager Module. bit 0-1: LCD 1 status bit 2-3: LCD 2 status bit 4-5: LCD 3 status bit 6-7: LCD 4 status status 0 = No tileis connected. 3 = Tile is fully connected. 2=Tile has communication but video is not present. This status is known to the Quad Input Manager Module only indirectly. Processor A1 polls all tiles for their status and then aggregates the status for each Quad Input Manager Module and communicates it back to the tile. This information is used to light the front panel LEDs. If polling is disabled, this information will not be current.
116	replies.sent	1139	RS232 RS485 AUX232	0 1 2		?			0 – 32767		Used only to indicate that replies have been sent. Resets to zero upon reaching its maximum value.
117	reset.balance	1034				[execute]					Resets color balance values to 100/7 (white 100; gray 7).
118	resolution.horizontal	16401			=	?			[varies]		
119	resolution.vertical	16402			=	?			[varies]		
120	revision [ST]	4				?					Retrieves text: firmware revision number.

Operation Commands for Runco WindowWall

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121	rs485.termination	1259				DISABLE ENABLE	0 1	
122	runtime.hours.high	1113			= ?	[hours / 10000]		Do not set backlight, runtime or system hours/minutes unless actual time was lost, such as when the control board is replaced. Note: Product warranties are not based on these timers.
123	runtime.hours.low	4100			= ?	[hours mod 10000]		
124	runtime.hours.reset	4613			[execute]			
125	runtime.minutes	4101			= ?	0 – 59		
126	saturation	16396			= ? + –	0 – 255 (source into VIM) 0-1024 (digital YPbPr)		This controls color saturation. Used when digital source is YPbPr.
127	serial.diagnostics.clear	1188	RS232 RS485 AUX232	0 1 2	[execute]			
128	sharpness	16397			= ? + –	0-15		
129	slot.action	1082	SAVE RECALL DELETE NONE	0 1 2 3	[execute]			Performs the action (save, recall, delete) on the currently targeted slot.
130	slot.current	1150			?	0 – 39 [slot # – 1] 255 [none now used]		
131	slot.delete	1174	0 [slot 1] 1 [slot 2] : 39 [slot 40] 255 [current target]		[execute]			

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
132	slot.full	1114	0 [slot 1] 1 [slot 2] : 39 [slot 40]	0 1 : 39		?			0 [empty] 1 [full]		
133	slot.name. [ST]	5									Returns the name that will be used when saving the target slot.
134	slot.name.clear	1081				[execute]					Operates on the currently selected slot (see slot.target and slot.recall.target)
135	slot.name.letter	1080	0 [1st char] 1 [2nd char] : 23 [last char]	0 1 : 23	=	?			[one ascii character value]		The target is the nth letter of the 24-character string: 0–23. The value is the ascii character to send: numbers, letters, punctuation. Not all punctuation is available.
136	slot.recall	1173	0 [slot 1] 1 [slot 2] : 39 [slot 40] 255 [current target]			[execute]					
137	slot.recall.target	1077			=				0 [slot 1] 1 [slot 2] : 39 [slot 40]	0 1 : 39	
138	slot.save	1172	0 [slot 1] 1 [slot 2] : 39 [slot 40] 255 [current target]			[execute]					Slot.save, slot.recall and slot.delete are more direct ways accomplishing what slot.action does.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
139	slot.setting	1078	OFFSET.RED GAIN.RED OFFSET.GREEN GAIN.GREEN OFFSET.BLUE GAIN.BLUE BRIGHTNESS COLORSPACE CONTRAST SHARPNESS HUE SATURATION POSITION.HORIZONTAL POSITION.VERTICAL ASPECT JUSTIFY OVERSCAN VIEWPORT.WINDOW.BOTTOM VIEWPORT.WINDOW.LEFT VIEWPORT.WINDOW.RIGHT VIEWPORT.WINDOW.TOP ZOOM.WINDOW.BOTTOM ZOOM.WINDOW.LEFT ZOOM.WINDOW.RIGHT ZOOM.WINDOW.TOP WALL.HEIGHT WALL.MODE WALL.COLUMN WALL.ROW WALL.WIDTH	16389 16390 16391 16392 16393 16394 16389 1169 16388 16397 16395 16396 16398 16399 1054 1053 1184 1042 1039 1040 1041 1047 1044 1045 1046 1049 1052 1051 1050 1048							
140	slot.state	1316							SAVE RECALL DELETE NONE	0 1 2 3	

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
141	slot.status	1083	0 [slot 1] 1 [slot 2] : 39 [slot 40]	0 1 : 39		?			EMPTY FILLED FILLED.AND.CURRENT NAME.EDITED	0 1 2 3	
142	slot.target	1068			=	?			0 [slot 1] 1 [slot 2] : 39 [slot 40]	0 1 : 39	Sets (or recalls) the target slot number for other actions. The target slot is used by slot.action, slot.name.clear, slot.name.letter, and slot.setting.)
143	source.search.status	1133				?			VIDEO.DISPLAYED GRAPHICS.DISPLAYED AUTO.RUNNING AUTO.SETUP.COMPLETE OUT.OF.RANGE SEARCHING DETECTED HOLDING IDLE	0 1 2 3 4 5 6 7 8	
144	sync.type	1064				?			UNKNOWN SOG COMPOSITE SEPARATE	0 1 2 3	SOG = sync on green SEPARATE = separate H and V sync
145	system.hours.high	1112			=	?			[hours / 10000]		Do not set backlight, runtime or system hours/minutes unless actual time was lost, such as when control board is replaced. Note: Product warranties are not based on these timers.
146	system.hours.low	4098			=	?			[hours mod 10000]		
147	system.hours.reset	4612			[execute]						
148	system.minutes	4099			=	?			0 – 59		
149	temperature.c	1153	BOARD LCD	0 1		?			0 – 125		Temperature, in Celsius. BOARD = control board

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set get inc dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
150	uart.clear	1187	RS232 RS485 AUX232	0 1 2	[execute]			
151	uart.errors	1186	RS232 RS485 AUX232	0 1 2	?	0 -32767		Resets to zero upon reaching its maximum value.
152	uart.overflows	1185	RS232 RS485 AUX232	0 1 2	?	0 -32767		Resets to zero upon reaching its maximum value.
153	update	1394			=	ALL P2 P3 P4 IDLE	0 1 2 3 255	Applicable only to processor 1 of a tile. Other processors will NAK. Force a tile to copy its firmware to the specified processor. This process takes a long time. While cloning is in progress, no further RS232 commands are possible. All input to that tile (including IR commands) will be ignored. While cloning, the LCD status lights on the front panel will change slowly from red to green. One of the lights will be opposite in color from the other three. That is the processor that is currently being cloned.
154	vertical.lines	1263			?	0 – 65535		Raw number of lines detected by the tile.
155	video.standard	17426			?	NTSC NTSC.60.443 PAL.50.358 PAL SECAM N/A	1 3 4 6 8 22	If the format is completely unknown, or it is not a video source, the response is N/A.

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
156	viewport.window.bottom	1042			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
157	viewport.window.height	1100				?			[pixels]		
158	viewport.window.left	1039			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
159	viewport.window.right	1040			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
160	viewport.window.top	1041			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
161	viewport.window.width	1099				?			[pixels]		
162	wall.column	1051			=	?	+	–	1 – 32		
163	wall.height	1049			=	?	+	–	1 – 32		
164	wall.mode	1052			=	?	+	–	DISABLE ENABLE	0 1	
165	wall.row	1050			=	?	+	–	1 – 32		

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
166	wall.status	1066				?			0 [ok] 1 [error horizontally] 2 [error vertically] 3 [this cube is blank]		
167	wall.width	1048			=	?	+	–	1 – 32		
168	white.balance	1285	RED GREEN BLUE ALL	0 1 2 3	=	?	+	–	0 – 100		
169	white.balance.percent	1285	RED GREEN BLUE ALL	0 1 2 3							
170	window.reset.size	1091			[execute]						Sets zoom and viewport windows back to default values.
171	ypbpr.reset	1181			[execute]				[to factory calibration]		
172	zoom.window.bottom	1047			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
173	zoom.window.height	1098				?			[pixels]		
174	zoom.window.left	1044			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
175	zoom.window.right	1045			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	

Operation Commands for Runco WindowWall

Row	Operation or String [ST]	Operation or String number	(Target) Target or Target number *must* be in parentheses.	(Target number)	Command types allowed (Use only one symbol) set	get	inc	dec	Value If numbers listed first, use numbers only. Data in [square brackets] is for information only.	Value number	Notes
176	zoom.window.top	1046			=	?	+	–	0 [–100] : 100 [0] : 200 [+100]	0 : 100 : 200	
177	zoom.window.width	1097				?			[pixels]		

Troubleshooting Serial Connections

There are many small details involved in getting an entire wall or group of tiles to communicate over a serial link. By starting with simple commands you can ensure all these details are in place before moving on to more complex control. If you are setting up a wall or group of tiles for the first time, follow these steps for easy setup. If you have problems later, you can refer to the troubleshooting flowcharts starting on page 53 as necessary.

Setup

1. Connect the RS232 cable from the computer to the RS232 In connector of Quad Input Manager Module A. Connect the out connector of that tile, to the In connector of the next tile and so on until all tiles are connected.

2. Each tile in the wall has a unique ID. The tile's group ID is the ID of the Quad Input Manager Module to which it's connected (A-P). The tile's unit ID is the output number to which it is connected (1-4).

3. Set the baud rate of the host computer to 19200. If this is not possible, set the baud rate of each tile to match the baud rate of the host computer. The baud rate is *not* set automatically. If the baud rate of a tile does not match the baud rate of the computer, communication will not happen.

4. Open a program on the host that allows you to easily type commands. Serial Talk, available from our website, is one such program. Be sure you know how to send a carriage return character with whatever program you are using. All commands to the tiles must end in a carriage return. The rest of this document will use Serial Talk syntax in the examples.

Global Command

1. Send the command `op ** pattern=red ^M`

2. Did all tiles in the wall put up a red test pattern?
   a. If yes, go on to send individual commands.
   b. If none of the tiles responded, go to Global Command to First Tile on page 53.
   c. If the first tile went red, but one or more of the others didn't, go to Global Command to Subsequent Tiles on page 54.

Individual Command

1. For each tile in the wall, send the command `op A1 pattern=blue ^M`, substituting each tile's ID in turn.
2. Did each tile turn blue when commanded?
   a. If not, check that you typed the ID correctly to match the tile.
3. Did you receive an echoed response back each time?
   a. If not, go to Response From Individual Tiles on page 55.

Data Query

1. Send a command which asks for information to each tile in turn. For example, `op A3 lcd.position(row)? ^M`
2. Did each tile return its row in the WindowWall?
   a. If not, go to Response From Individual Tiles on page 55.

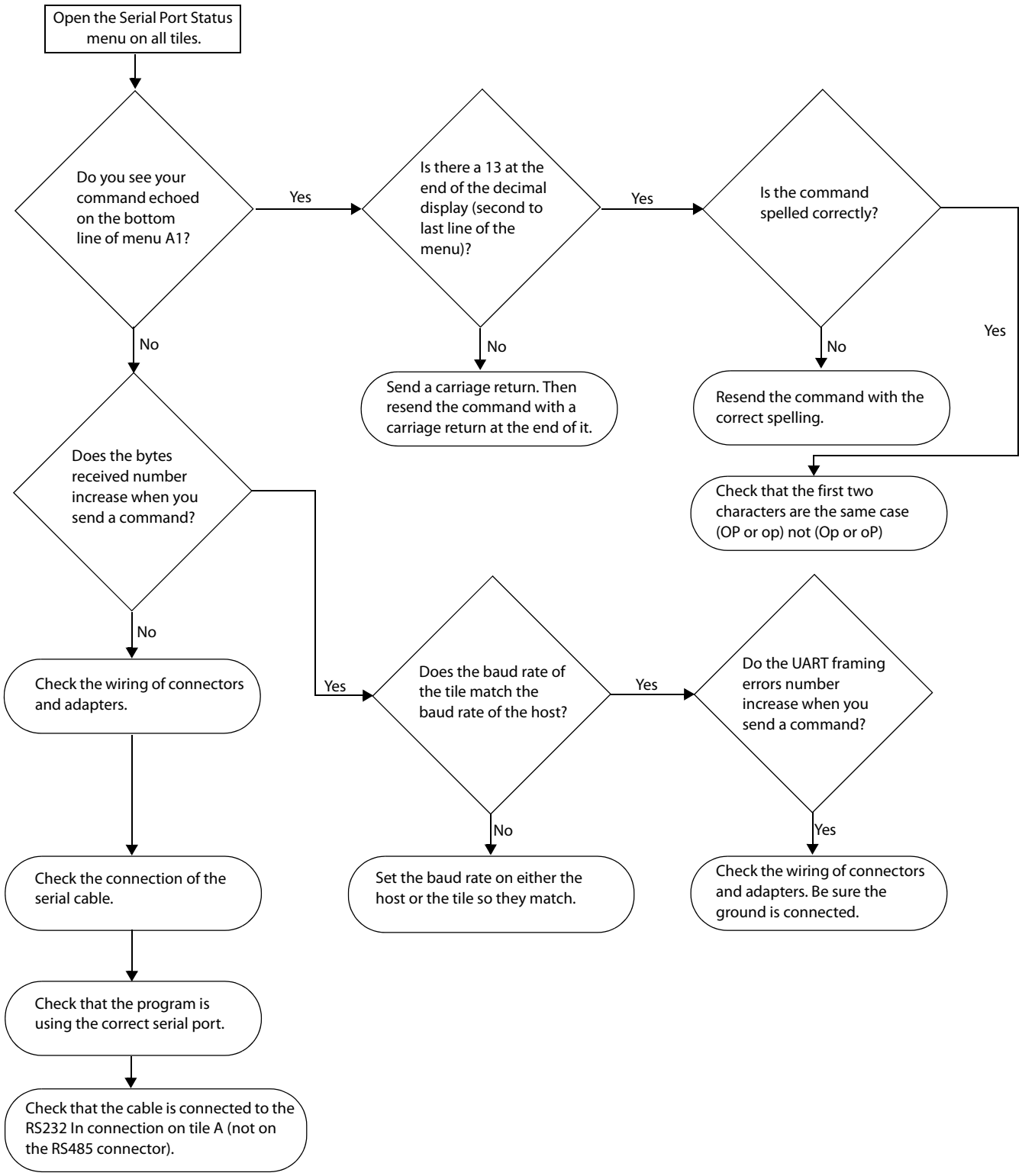
Troubleshooting Useful Commands

If you are trying to send a particular command and are having trouble, first make sure you have established the wiring and settings are correct by using the simple commands suggested above. After you have established that, the problem is probably in the command itself.

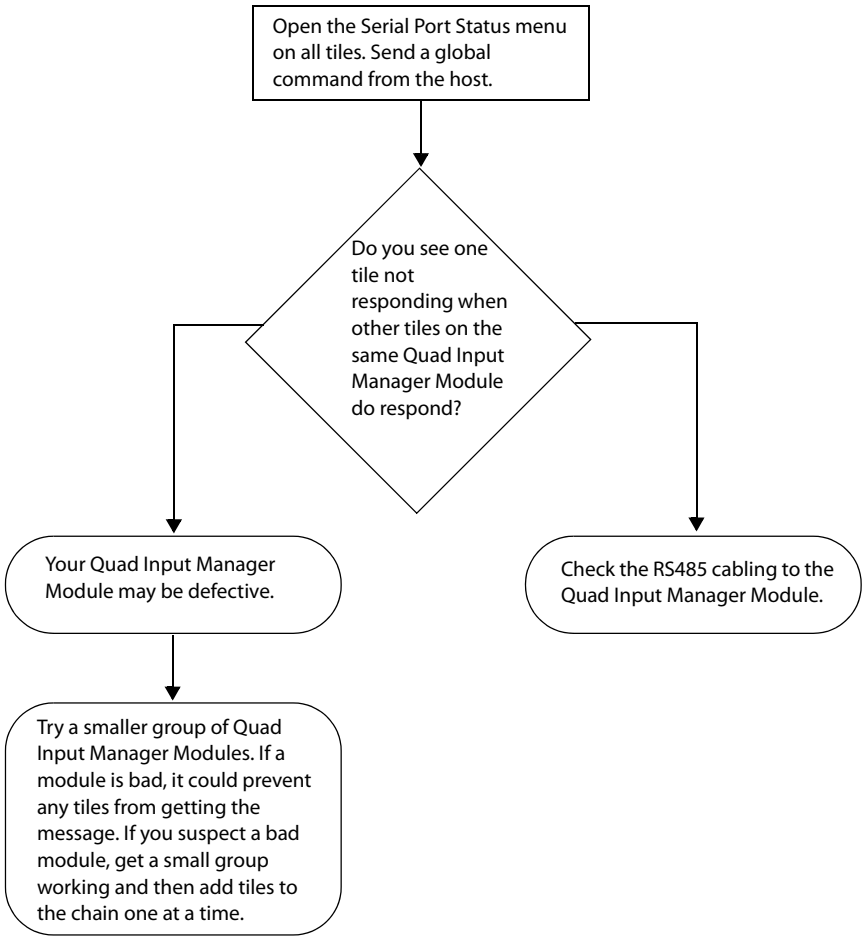
If a tile doesn't respond to a particular command, look at the "Commands Received" number. If it doesn't increase by one, the tile didn't understand the command. Double check the spelling and syntax. Be sure to start operations with `op` or `OP`, not `oP` or `Op`. Be sure to end with a ^M.

If the Commands Received increases but the tile didn't respond, it may be in a state where it cannot respond at this time, or it may have invalid data. Try sending the command with an individual (not global) address, and watch the response. If it sends a `NAK`, it wasn't able to carry out the command. For example, you can't change the brightness unless you have a valid source. It will also send a `NAK` if the data is out of range. For example, you can't set the brightness to 1000. If it sends an `ERR`, it didn't understand the command. Perhaps it is spelled wrong, or you are trying a command that is not valid on this product.

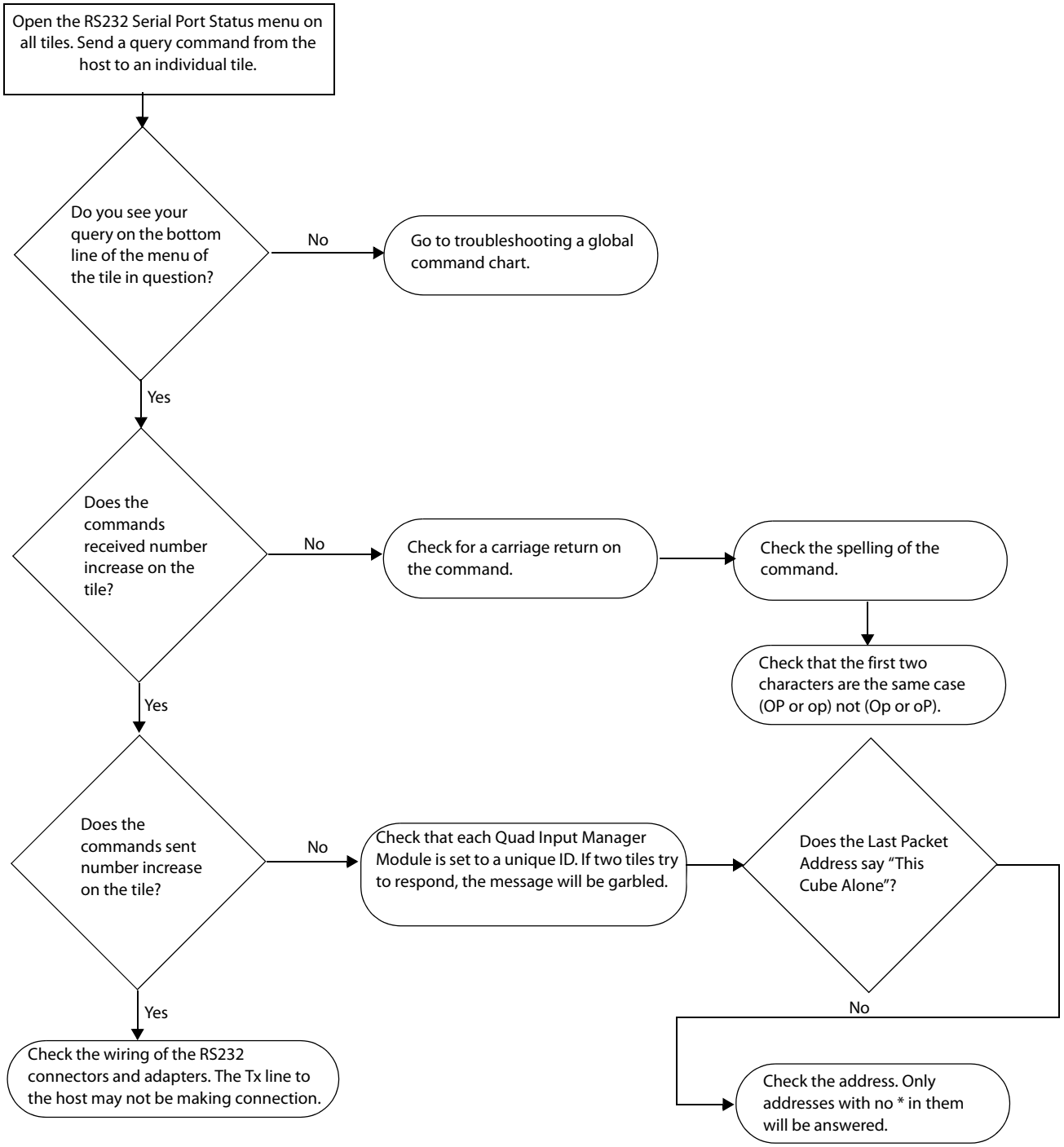
Global Command to First Tile



Global Command to Subsequent Tiles



Response From Individual Tiles



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